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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/672,521

09/26/2003

Toru Takayama

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EXAMINER

NGUYEN, HA T

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 02/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/672,521

Applicant(s)

TAKAYAMA ET AL.

Examiner

Ha T. Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-45 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 26-45 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 09-20-03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION***Claim Rejections - 35 USC § 112***

1. Claims 36-45 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

All the claims recite the step of forming a semiconductor film over the wiring. There is not enough support for this feature in the disclosure. Figs. 16(B) and 16(C) show layer 909 and 910 of doped silicon, respectively, but neither is on a W wiring.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(a) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 26-28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda (USPN 6078071) in view of Oikawa et al. (USPN 4619695, hereinafter "Oikawa").

Referring to Figs. 5E-6E and related text, Matsuda discloses [Re claim 26] a method of manufacturing a wiring in a semiconductor device comprising the steps of: forming a tungsten

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film 128 or 210 by a sputtering method; and patterning the tungsten film (see Fig. 5F or 6F). But it fails to disclose expressly wherein an amount of sodium contained within the wiring is 0.3 ppm or less. However, the missing limitation is well known in the art because Oikawa discloses this feature (See col. 6, lines 16-26 and col. 8, lines 6-13). A person of ordinary skill is motivated to modify Matsuda with Oikawa to obtain wiring of good performance characteristics (see Oikawa, Summary).

[Re claim 27] Oikawa also discloses wherein the sputtering tungsten target having a purity of 4N or more (see Example 10); and

[Re claim 28] wherein the sputtering method uses argon as a sputtering gas (see col. 2, lines 3-6).

[Re claim 30] Matsuda also discloses wherein the sputtering method is performed at a gas pressure from 1.0 Pa to 3.0 Pa (see col. 8, lines 27-36).

Therefore, it would have been obvious to combine Matsuda with Oikawa to obtain the invention as specified in claims 26-28 and 30.

4. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Oikawa, as applied above, and further in view of Brodsky et al. (USPN 6245668, hereinafter "Brodsky").

The combined teaching of Matsuda and Oikawa discloses substantially the limitations of claims 29-30, as shown above.

But it fails to disclose expressly the claimed sputtering conditions.

However, the missing limitations are well known in the art because Brodsky discloses these features (See col. 2, lines 41-54 and col. 5, lines 26-36).

A person of ordinary skill is motivated to modify Matsuda and Oikawa with Brodsky to obtain W layer at a low temperature ensuring the reliability of the device made.

Therefore, it would have been obvious to combine Matsuda and Oikawa with Brodsky to obtain the invention as specified in claims 29-30.

5. Claims 31 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Ikeda et al. (JP 408153722A, hereinafter "Ikeda").

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[Re claim 31] Matsuda discloses substantially the limitations of claim 31, as shown above. But it fails to disclose expressly wherein the wiring contains inert element and 90% or more of the inert elements is argon.

However, the missing limitation is well known in the art because Ikeda discloses this feature, in the case where Ar concentration is 5 atom % and W is 95 atom % (See Constitution).

A person of ordinary skill is motivated to modify Matsuda with Ikeda to obtain W which is of low resistivity and easy to handle.

[Re claim 35] Matsuda also discloses wherein the sputtering method is performed at a gas pressure from 1.0 Pa to 3.0 Pa (see col. 8, lines 27-36).

Therefore, it would have been obvious to combine Matsuda with Ikeda to obtain the invention as specified in claims 31 and 35.

6. Claims 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Ikeda , as applied above, and further in view of Brodsky.

The combined teaching of Matsuda and Ikeda discloses substantially the limitations of claims 32-35, as shown above.

But it fails to disclose expressly the sputtering conditions and the purity of the W target .

However, the missing limitations are well known in the art because Brodsky discloses these features (See col. 2 , lines 41-54, col. 4, lines 41-44, and col. 5, lines 26-36).

A person of ordinary skill is motivated to modify Matsuda and Ikeda with Brodsky to obtain W layer at a low temperature ensuring the reliability of the device made.

Therefore, it would have been obvious to combine Matsuda and Ikeda with Brodsky to obtain the invention as specified in claims 32-35.

7. Claims 36 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Oikawa or Ikeda , as applied above, and further in view of Kobeda et al. (USPN 5208170, hereinafter "Kobeda").

The combined teaching of Matsuda and Oikawa or Ikeda discloses substantially the limitations of claims 36 and 41, as shown above.

But it fails to disclose expressly forming a semiconductor film over the wiring.

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However, the missing limitation is well known in the art because Kobeda discloses this feature (See abstract).

A person of ordinary skill is motivated to modify Matsuda and Oikawa or Ikeda with Kobeda to obtain an etch stop layer in subsequent forming steps using dry etching.

Therefore, it would have been obvious to combine with Kobeda to obtain the invention as specified in claims 36 and 41.

8. Claims 37-40 and 42-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda in view of Oikawa or Ikeda , and Kobeda, as applied above, and further in view of Brodsky.

All the features of claims 37-40 and 42-45 have been previously shown to be obvious to an ordinary artisan.

Therefore, it would have been obvious to combine Matsuda, Oikawa or Ikeda , and Kobeda with Brodsky to obtain the invention as specified in claims 37-40 and 42-45.

Conclusion

9. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt, can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ha Nguyen

Primary Examiner

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